THE BELLONA
MANUAL OF

MILITARY FIELD WORKS OF THE 18TH & 19TH CENTURIES

Illustrations by William Holmes F.R.S.A.

OBSTACLES

These are means by which the progress of the enemy is impeded and delayed.

His advance can be diverted into specially prepared defence and slowed down to such a degree that he becomes a sitting target for musketry.

He can be denied advantageous ground and prevented from approaching near enough to hurl grenades.

The obstacles can take the form of snares and traps for the unwary, and can be arranged to give warning of the approach of intruders by night.

Various means were used to achieve these desirable results; often a combination of several. The variations and adaptations to circumstances are too numerous to include in this work, but the main principles are shown:-

Abatis felled trees and branches, with sharpened points towards the enemy.

Chevaux de Frises a portable arrangement of spikes set in a beam and used either as a means for closing a road or making a continuous barrier. A frequent variation was a hedge of pointed stakes set in the ground.

Ditch often combined with the foregoing, but also used on its own either dry or water-filled.

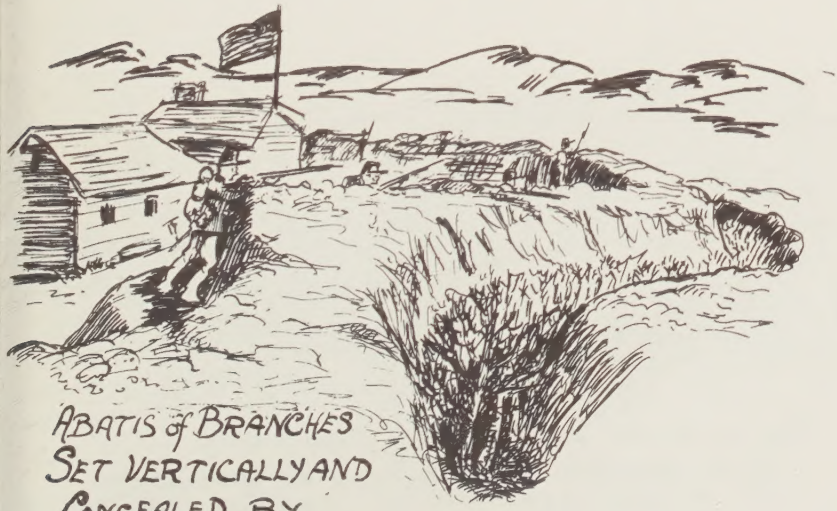
Trous de Loup a hole, or series of holes, having pointed stakes set in the bottom. Very often concealed by a covering of grass, branches etc. An amusing variation of the principle of the Chevaux de Frises.

Wire Entanglements a methodically arranged wire fence to prevent progress and to keep the enemy at a distance. When barbed wire came into use it was even better It could be high or set low to trip, and by means of bottles or tin cans hung thereon made a splendid alarm warning. In principle it is really the Abatis again.

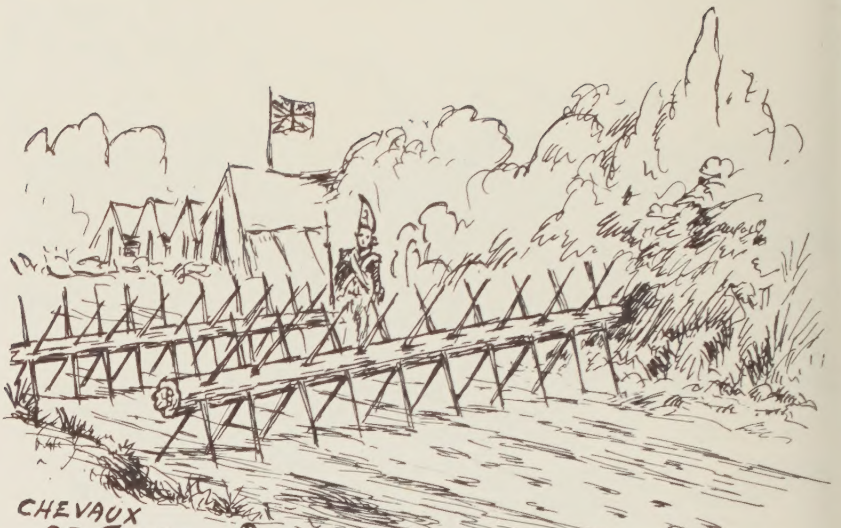
There is nothing new!

ABATIS OF FELLED TREES. BRANCHES & SHARPENED POINTS TOWARDS THE ENEMY

ABATIS OF BRANCHES COMBINED WITH EARTHWORKS



ABATIS of BRANCHES SET VERTICALLY AND CONCEALED BY DITCH.

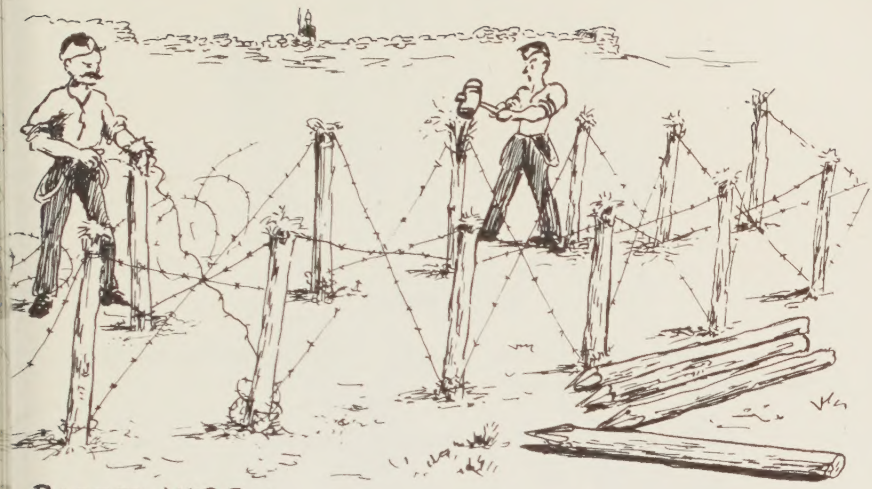


CHEVAUX DE FRISES. PORTABLE BARRIER OF IRON SPIKES SET IN TIMBER BEAMS.
USED FOR CLOSING A ROAD: CLOSING GAP IN DEFENCES: OR AS A CONTUOUS BARRIER.

FORM OF CHEVAUX DE FRISES — FIXED SHARPENED STAKES SET IN TOP OF EARTHWORK.

TAKU FORTS. CHINA 1860.

FORM OF CHEVAUX DE FRISES.
FIXED SHARPENED STAKES & SWORD AND SPEAR BLADES SET IN DEEP WIDE TRENCH. KHARTOUM 1884.



BARBED WIRE :

EARLY WARNING SYSTEMS. LOOK-OUT PROTECTED BY LOW TRIP WIRE BEARING OLD TIN CANS – U.S.A. 1863.

TROUS DE LOUP. PITFALLS SET IN APPROACHES, CONSISTING OF CONCEALED FUNNEL-SHAPED HOLES WITH "STAKES AT THE BOTTOM TO DISTRESS TROOPS" – DICTIONARY.

FIELD WORKS

Whatever their purpose, Attack, Defence, or Shelter, all Field Works can be classified as:-

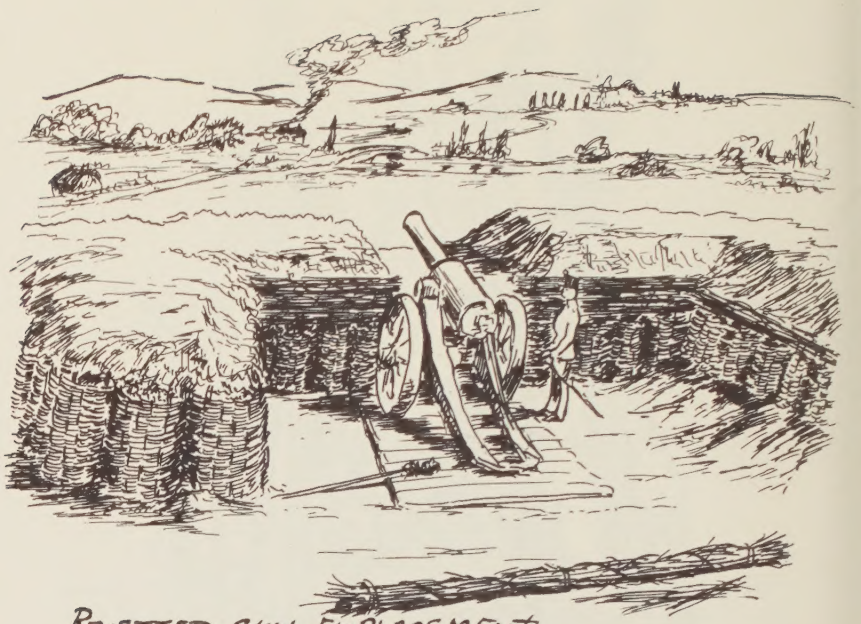
Deliberate	Positions to be defended.
Hasty	Improvised
Siegeworks	Sustained Attack

Deliberate defences may be constructed earthworks either above ground (breastworks), or excavated (entrenchments). Means must be adopted to make the earthworks stand up at the steep slopes required. This is called Revetting, and can be carried out with timbers, gabions, and fascines, and can be executed by the military engineers without interference from the enemy.

Hasty defences are any kind of improvised protection thrown as the circumstances of a situation permit; time, materials available, proximity of the enemy. They may be either breastworks or entrenchments, again depending on circumstances and the nature of the ground Shelters, whether to give protection from the elements or the enemy, must similarly be improvised from the means at hand, a few examples of which are shown.

Siege Works are of much the same character as Deliberate Defences, being carefully constructed from materials brought up by the Army, and being of a solid character intended for prolonged use. The main difference is that the Siege Works have to be constructed in the face of the enemy, so that a position can well be classed as Hasty until the siege settles down and better protection can be erected. In some of the examples illustrated, particularly of the Crimea, it will be observed that the trenches of the attack were really nothing better than a shallow excavation with a breastwork. Protection from the rear was not considered necessary: the exploding shell was still in its infancy. On the other hand, the sap or zig-zag, dug forward to the position for the next front line or parallel, had to be properly dug from the bottom as it went along so that it eventually became a communication trench affording full protection.

REVETTED EARTHWORK
BOARDS AND SANDBAG PARAPET



REVETTED GUN EMPLACEMENT
USING FASCINES AND GABIONS. 1870.

SANDBAGGED GUN EMPLACEMENT
LADYSMITH 1899

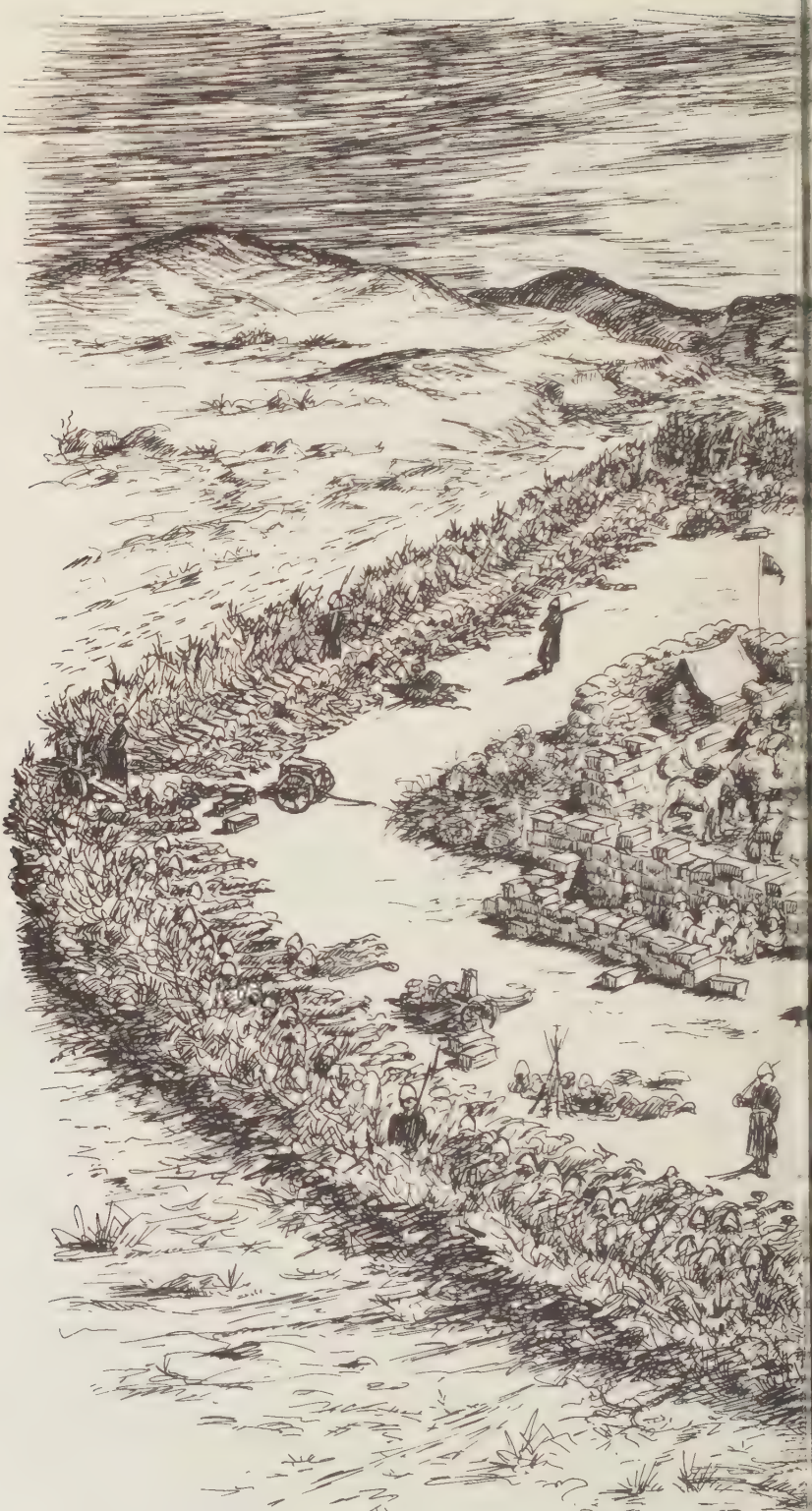
A CLASSIC DEFENDED EARTHWORK - REVETTED WITH SANDBAGS, GABIONS, & TIMBERS
THE REDAN - SEBASTOPOL 1854.

ENTRENCHED OUTPOST LINE - SANDBAGGED. SEDAN 1870.

STOCKADE FORTIFICATION — N. AMERICA 1758

PALISADES

LOG FORTIFICATION - N. AMERICA 1758.

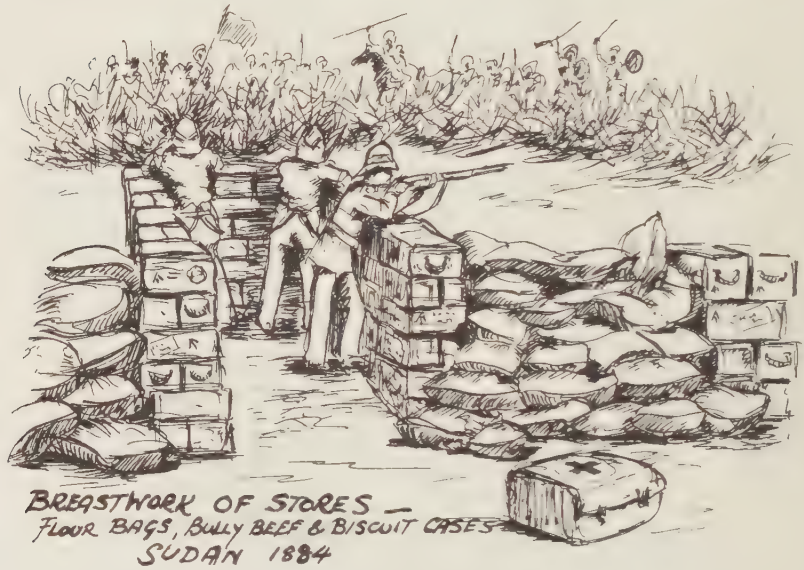


ZAREBA. DESERT COLUMN. SUDAN 188-

A COMBINATION OF THORN
PROTECTING TRANSPORT
GUNS AT THE CORN

A TEMPORARY DEFENDED CAMP WHILE ON THE MARCH.
ABATIS AND IMPROVISED BREASTWORKS OF STORES
IMALS IN THE CENTRE. NORDENFELDT AND GATLING

BREASTWORK OF MEALIE BAGS – RORKE'S DRIFT 1879



BREASTWORK OF STORES – FLOUR BAGS, BULLY BEEF & BISCUIT CASES SUDAN 1884

BREASTWORK OF CAMEL SADDLES BAYOUDA DESERT, SUDAN, 1884

SANGAR. DRY STONE BREASTWORK. PIQUET POST
N.W. FRONTIER 1895.

BLOCKHOUSE. S. AFRICA 1900-1

STREET BARRICADE.
PARIS 1870.

DEFENDED HOUSE. PLANCHENOIT, WATERLOO 1815.

DEFENDED BUILDING - LOOPHOLED WALLS AND IMPROVISED PLATFORMS.

HOUGOMONT, WATERLOO 1815.

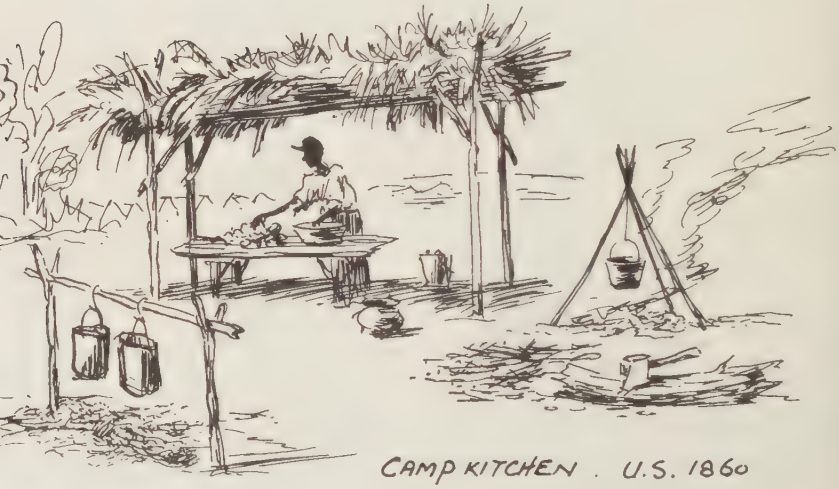
SIEGE WORKS - TWO-TIER GABIONS -
HEAVY BATTERY AGAINST THE REDAN - CRIMEA 1855

SIEGE WORKS - CRIMEA 1854. PART OF A TRENCH (PARALLEL) WITH A MORTAR POSITION AND A ZIG-ZAG OR SAP LEADING FORWARD TO THE NEXT PARALLEL.

SIEGE WORKS.
DIGGING A ZIG-ZAG OR SAP - CRIMEA 1854

SIEGE WORKS. GERMAN HEAVY SIEGE BATTERY. STRASSBURG 1870
EARTHWORK COMBINATION OF GABIONS, FASCINES, AND SANDBAGS.

BIVOUAC SHELTERS
U.S. 1862

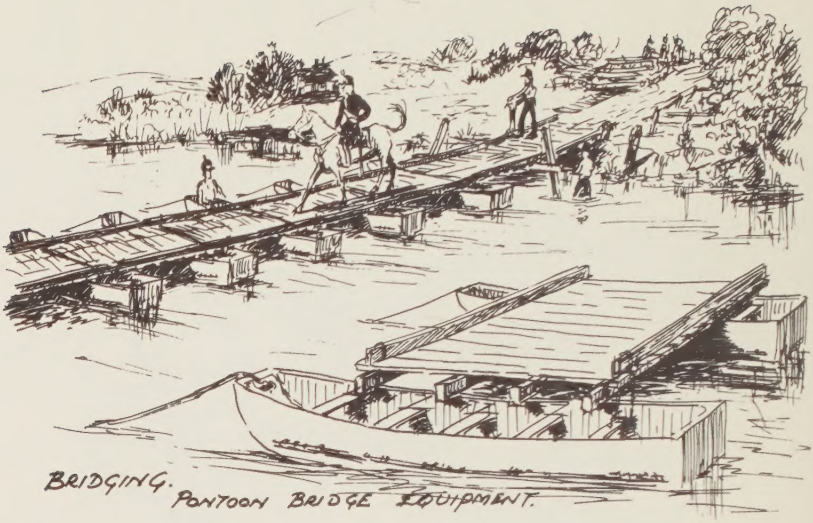


CAMP KITCHEN . U.S. 1860

BULLET PROOF SHELTER . KIMBERLEY 1899 .

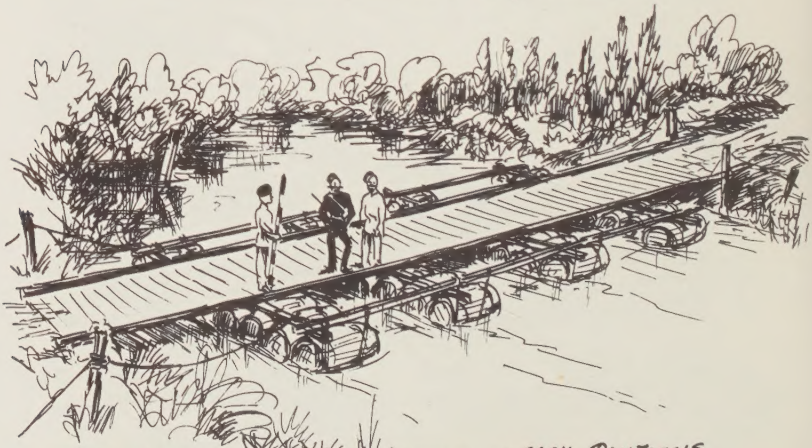
SHELL PROOF SHELTER - LADYSMITH 1899

SHELL PROOF SHELTER - BOER DEFENCES.
PAARDEBERG 1900 - MEALIE BAGS & STONES.



BRIDGING. PONTOON BRIDGE EQUIPMENT.

BRIDGING. INFANTRY SUSPENSION BRIDGE. LIGHT DUTY TRESTLE. HEAVY DUTY TRESTLE. 1800.



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